



PRIVATE-SCHOOLS - DESIGN

# The Maker Movement in schools has students learning by doing



Students connect littleBits electronic building blocks at the IDEA Lab at Stratford Hall school in Vancouver.

DARRYL DYCK/THE GLOBE AND MAIL



"How am I supposed to build a trampoline that bounces people 35 feet into the air?"

Ms. Penafiel, the learning specialist and teacher librarian at Stratford Hall in Vancouver, answers: "You are going to have to use your imagination and be sooooo creative."

It is early September and Stratford Hall's Grade 5 students are an hour into their first Design Time class of the year.

They are doing a speed run through the design process to come up with improvements to their rooftop playground, which is currently beset by hockey pucks whizzing through the air, overcrowding in the toy shed, overheating in the summer and icing over in winter.

Children scurry to gather materials and quickly get to work designing prototypes of swimming pools, rotating floor tiles and a glass roof. "What we're trying to do is teach that design-thinking culture and innovator's mindset through these projects," Ms. Penafiel explains over the loud din.

By the end of the year, these students will have designed and built their own catapults as part of a unit on simple machines and will have come up with their own nutritious granola-bar recipes for a unit on the human body. They will be able to brainstorm more than 100 ideas in five minutes and they will be well-versed in collaborating, communicating and failing fast.

"We want to turn little kids into little creative minds," says interim head of school Susan Groesbeck. "This is the opposite of rote learning."

The space, and the interdisciplinary, hands-on learning it nurtures, are such a hit with students, parents and teachers that the independent International Baccalaureate school will be renovating the basement of one of its three buildings in the coming months to expand the IDEA Lab. Its current 450-square-foot space will grow into a 3,000-square-foot space that will include a laser cutter, a test kitchen, a multimedia space and a presentation stage.

"So the kids get to tinker and there's no better learning than doing," says Dr. Groesbeck, who explains Stratford's approach to weaving the IDEA Lab into as many subjects and disciplines as possible, from history to biology to governance.

"We want to be one of the schools that has this, not as a frill or as an add-on, but really integrates it into the curriculum. The children are going to be excited and so super challenged."

Ever since the Maker Movement got going in the early 2000s, it was a matter of time before the tech-oriented DIY movement's philosophies were adopted into the classroom, as teachers and librarians saw the value of creating dedicated tinkering spaces, known as makerspaces, for students.

"For a lot of the history of school, we've kind of done this rote memorization and standardized testing as a means of providing an efficient [education] system, all the while ignoring the fact that it's not how most people learn," says Sylvia Libow Martinez, co-author of the book *Invent To Learn: Making, Tinkering, and Engineering in the Classroom*.

"What's good about the Maker Movement is it's helping teachers find their own voice and be able to articulate what's right about education in a way that makes sense in the modern world."

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Stratford Hall's IDEA Lab got its start five years ago when Ms. Penafiel and a physical education teacher were inspired by Google's practice of giving its staff 20 per cent of their time to work on a personal project.

Thus Genius Hour for the students was born. Before long, it was clear that the students needed a dedicated space for their projects and so the IDEA Lab was born.

"It's that idea of the classroom as the third teacher," she explains. "If we want to be doing more hands-on projects, we need a space that inspires and ignites their thinking."

Today, students from kindergarten on up use the space either as a standalone class, as a space to host interdisciplinary teaching in the older years, or as a personal tinkering space. "They just love that they can be messy, creative and spread out," says Ms. Penafiel. "I think that's what all kids love. They just want to make. They want to show what they're thinking and show what they're learning through their hands."

The 21st-century equivalent of shop class or home economics, educational makerspaces prioritize process over outcome; collaboration and experimentation over skill acquisition; and soft skills of empathy and social, emotional learning over hard skills. It's no longer about everyone learning to bake the same blueberry muffin recipe perfectly; it's about experimenting to come up with a muffin that your team is happy with and learning from your mistakes.

"We really want kids to leave here feeling that they are problem finders and problem solvers. We don't know what the problems are going to be in the future. We don't know the technology these students are going to be using, so it's not about coding for the sake of coding, or teaching saw skills for the sake of being able to saw," says Andrea Ryan, the school's learning specialist for design integration. "It's that sense of empowerment to be able to go forth and be and do."

"Strong research suggests that messing around is not wasted time and that it's actually what the brain needs to both relax and concentrate on important aspects," says Ms. Martinez, who stresses the difference between handing children a bunch of app-laden tablets and what happens in educational makerspaces, where children are in charge of technology.

"If you're just going to replicate the most rote, the most boring parts of school on a computer screen, that's not what I'm talking about."

Ms. Martinez explains that the technology unto itself is not equivalent to teaching. The

distinction between having children in charge of the technology, and children passively consume it is key, as identified by the late Seymour Papert, pioneer of educational technology and MIT Media Lab professor.

"One of [Dr.] Papert's seminal questions is: Does the child program the computer or does the computer program the child," she says. "And you have to know which side you're on."

- Anne Casselman, *Special to The Globe and Mail*

## **Companies partnering with schools to help foster student innovation**

With the ever-increasing demand for jobs in the fields of science, technology, engineering and math, schools are examining new and innovative ways to ignite students' passions for those subjects.

As a result, a number of companies have started to create camps and travelling workshops to get students thinking about STEM subjects in novel ways, and private schools are among their clients. Here is a quick look at a trio of Canadian companies doing exactly that.

### ***MakerKids***

MakerKids was founded in Toronto seven years ago out of the MaRS Discovery District in downtown Toronto to teach children how to leverage their passions and build 21st-century skills.

The company works with private schools, such as Ashbury College in Ottawa, among others, to run camps in coding, robotics and curricula related to popular video games, such as Minecraft. By bringing together like-minded individuals, the aim is not only to deepen students' understanding of STEM subjects, but also to improve their soft skills, such as their social interaction, confidence and their level of engagement at school.

Classes are taught by engineers, designers, artists and entrepreneurs, and are designed to help children between the ages of 8 and 12 move from being consumers to being creators, with an emphasis on values such as ownership, learning how to learn, thinking outside the box and being open to challenges.

MakerKids has achieved a number of successes, such as students presenting MakerKids

projects on national TV, as well as starting their own businesses off the back of their new-found skills, such as one 10-year-old who went on to make, sell and fix audio speakers in his neighbourhood.

### ***Future Design School***

Working with a host of private schools, such as Upper Canada College and Bishop Strachan School in Toronto, Future Design School aims to encourage creative leadership and innovation.

With students facing an uncertain future against a backdrop of climate change, rising populism and the scarcity of finite resources, schools seek to develop young people's abilities to create unique solutions.

The organization helps institutions utilize the concepts of entrepreneurship and global mindfulness.

At Toronto's Havergal College, for instance, Future Design School worked with teachers to embed experiential learning opportunities in their classrooms.

"It allowed teachers to voice their hopes and aspirations on behalf of their students," said Garth Nichols, Havergal's vice-president of student engagement and experiential education. "Focusing on student agency and engagement, we have a shared language and understanding of what is possible."

At Toronto's Branksome Hall, FDS helped teachers introduce new problem-solving methodologies into their classrooms through professional development workshops.

### ***Kids Learning Code***

A sister program of Ladies Learning Code and Girls Learning Code, Kids Learning Code is a non-profit co-ed workshop for 8- to 13-year-olds that has hosted after-school or lunchtime coding clubs, as well as partnered on summer camps.

Private institutions such as Ottawa's Elmwood School or Victoria's St. Margaret's School have brought the program's collaborative learning experience to their students, allowing

them the chance to build websites and work on other personal projects.

The program also uses its computer lab on wheels, Code Mobile, to demonstrate to educators the accessibility of coding education, such as those at the Holy Name of Mary College School in Mississauga, Ont.

In the summer of 2016, the Code Mobile truck drove coast to coast, visiting more than 50 Canadian cities, teaching more than 11,000 kids to code.

- *Paul Attfield*

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